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10/558,158

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Seiji Hidaka

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EXAMINER

HAMILL, ERIC R

ART UNIT

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2817

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/558,158	<b>Applicant(s)</b> HIDAKA ET AL.	
	<b>Examiner</b> ERIC R. HAMILL	<b>Art Unit</b> 2817	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 7-16 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-10, 14-16 and 18-26 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 7 is being rejected under 35 U.S.C. 102(b) as being anticipated by Hiratsuka (US Patent No. 6,201,456).

Regarding claim 7, Hiratsuka teaches a stepped impedance structured (Fig. 2 is a stepped impedance structure as admitted by applicants specification in the Background Art) resonator (Abstract) comprising

a laminate having superposed set of first, second and third layers (Fig. 2 has laminated layers 21a, 21b and 20);

the second layer (Fig. 2, layer 20) which is disposed between the first and third layers (Fig. 2) being a dielectric (Col. 4, line 31);

each of the first and third layers being conductive layers (Fig. 2, layers 21a and 21b; col. 4, lines 34-37) having spaced first and second non-conductive areas (Fig. 2;

openings 22a) with a first conductive area therebetween (Fig. 2, shows an unlabeled conductive layer between the non-conductive areas 25c);

at least a portion of the first non-conductive areas of the first and third layers overlapping in the lamination direction (Fig. 2, non-conductive areas 22a and 22b) and at least a portion of the second non-conductive areas of the first and third layers overlapping in a lamination direction (Fig. 2, non-conductive areas 22a and 22b) to thereby form inductive areas (The conductor openings 21a and 21b at both ends are formed relatively large and the width of the central conductor openings 25c and 25d are relatively small, thus both ends of the slot are inductive; See also applicants admission of inductance in his description of background art with reference to Fig. 13); and at least a portion of the first conductive areas of the first and third layers overlapping in the lamination direction (Fig. 2, shows an unlabeled conductive layer between the non-conductive areas 25c) to thereby form a capacitive area (Since the unlabeled conductive layers between the non-conductive areas 25c consist of laminated conductive layers, with a dielectric layer 20 therebetween, it inherently forms a capacitive area).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8-10, 14-16, and 18-26 are being rejected under 35 U.S.C. 103(a) as being unpatentable over Hiratsuka (US Patent No 6,201,456) in view of Kajikawa (US Patent No 6,172,572).

Regarding claims 8 and 9, Hiratsuka does not show a resonator wherein the laminate contains additional layers disposed to form at least one additional superposed set of said first, second and third layers.

Kajikawa (Fig. 2) discloses a similar resonator having a plurality of superposed alternately stacked dielectric layers **12**, **13** and conductor layers **12a**, **12b**, **13a**, **13b**.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to provide a plurality of superposed alternately stacked dielectric layers and conductor layers in Hiratsuka's device in order to provide the benefit of reducing the size of the filter/resonator, and to provide stronger coupling, as taught by Kajikawa (Col. 9, lines 30-35).

Regarding claim 9, Kajikawa further discloses a resonator of claim 8, wherein one of the layers is a conductive layer conductor (Fig. 2, layers **12a**, **12b**, **13a**, **13b**) in two of the sets in the laminate (Fig. 2).

Regarding claim 10, Kajikawa fails to clearly show that at least one of a dielectric constant and a thickness of the second layer in two of the sets are different.

However, it would have been an obvious matter of design choice to one of ordinary skill in the art, at the time the invention was made, to have made the dielectric layers with different thicknesses since it is well known in the art that changing the dielectric thicknesses of the resonators changes the resonant frequencies of the devices (See for example Hiratsuka, suggesting that resonance frequency is a function of various factors including substrate thickness, Col. 6, lines 35-37).

Regarding claim 14, Hiratsuka fails to teach, in the description of Fig. 2, a stepped impedance structured resonator wherein each of the first and third layers have a third non-conductive area which is spaced from the first non-conductive area with a second conductive area therebetween; at least a portion of the third non-conductive areas of the first and third layers overlapping in the lamination direction, and at least a portion of the second conductive areas of the first and third layers overlapping in the lamination direction.

However, Col. 5, lines 63-65 suggests that the first embodiment, i.e. Fig. 2, can be made with two or more resonators; thus there will be at least a third non-conductive resonator area in Fig. 2, which is spaced from the first non-conductive area with a second conductive area therebetween (Col. 5, lines 63-65); at least a portion of the third non-conductive areas of the first and third layers overlapping in the lamination direction (Col. 5, lines 63-65, and Figs. 4-6 show how the non-conductive areas of multiple resonators will overlap), and at least a portion of the second conductive areas of the first

and third layers overlapping in the lamination direction (When the resonators of Fig 2 are made with multiple resonators, as suggested at Col. 5, lines 63-65, the conductive layers of two conductive areas will overlap in the lamination direction).

Therefore it would have been obvious to one of ordinary skill at the time the invention was made to have made the embodiment of Fig. 2, with three or more resonators/non-conductive areas, as suggested by Hiratsuka, because Hiratsuka suggests that having a third non-conductive opening creates the benefit of multiple resonators which may be coupled to each other regardless of whether they are adjacent or distant to each other (Col. 5, lines 63-67).

Regarding claim 15, Hiratsuka further teaches a stepped impedance structured resonator wherein the overlapping non-conductive areas are circular (Col. 6, lines 1-2).

Regarding claim 16, in Fig. 2 Hiratsuka fails to teach a stepped impedance structured resonator wherein the shape of the first overlapping non-conductive areas of the first and third layers perpendicular to lamination direction are different.

However, col. 5, lines 47-53 suggests that the first embodiment, i.e. Fig. 2, can be made as a stepped impedance structured resonator wherein the shape of the first overlapping non-conductive areas (fig. 2, areas 25c and 25d) of the first (Fig. 2, layer 21a) and third layers (Fig. 2, layer 21b) perpendicular to lamination direction are different (the principal surfaces for the non-electrodes may be different or asymmetrical, Col. 5, lines 47-53).

Therefore it would have been obvious to one of ordinary skill at the time the invention was made to have made the embodiment of Fig. 2, with different non-electrode principal surfaces, as suggested by Hiratsuka, because Hiratsuka suggests that having different non-electrode principal surfaces provides the benefit of being able to adjust the coupling coefficient of the device (Col. 5, lines 51-53).

Regarding claim 18, Hiratsuka further teaches a stepped impedance structured resonator wherein a surface of the third layer (Fig. 2, layer 21a) is disposed on a surface of a dielectric substrate (Fig. 2, strips 13a and 13b; Col. 4, lines 51-55).

Regarding claim 19, Hiratsuka further teaches a stepped impedance structured resonator wherein a shielding electrode (Fig. 2, lower conductor case 12) is disposed on at least one outermost (Fig. 2) surface of the dielectric substrate (Fig. 2, strips 13a and 13b) on which the third layer is disposed (Fig. 2).

Regarding claim 20, Hiratsuka further teaches a stepped impedance structured resonator wherein the first layer (Fig. 2, layer 21a) is covered by conductive cap (Fig. 2, cap 11).

Regarding claim 21, Hiratsuka further teaches a stepped impedance structured resonator having signal input/output (Col. 4, line 56) means (i.e. strips 13a and 13b) coupled thereto.

Regarding claim 22, in Fig. 2 Hiratsuka fails to teach a communication apparatus comprising a filter of claim 21 coupled to an antenna.

However, col. 3, lines 42-49, and claims 14-16, suggests that any of the dielectric filters of his invention, including Fig. 2, can be used to create a duplexer (Col. 3, lines 42-49; see also claims 14-16) which is a communication (Col. 8, line 9) apparatus comprising a filter of claim 21 coupled to an antenna (Fig. 7, antenna 53).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to have coupled an antenna to the dielectric filter of Fig. 2 as suggested by Hiratsuka, since Hiratsuka suggests that coupling an antenna to at least one of the dielectric filters of the invention results in a duplexer which has better coupling between resonators and thus wide band characteristic (Col. 8, lines 26-28).

Regarding claim 23, in Fig. 2 Hiratsuka fails to teach a dielectric filter of Fig. 2 is a communication apparatus comprising a stepped impedance structured resonator of claim 10 coupled to an antenna.

However, col. 3, lines 42-49, and claims 14-16, suggests that any of the dielectric filters of his invention, including Fig. 2, can be used to create a duplexer (Col. 3, lines 42-49; see also claims 14-16) which is a communication (Col. 8, line 9) apparatus comprising a stepped impedance structured resonator of claim 10 coupled to an antenna (Fig. 7, antenna 53).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to have coupled an antenna to the dielectric filter of Fig. 2 as suggested by Hiratsuka, since Hiratsuka suggests that coupling an antenna to at least one of the dielectric filters of the invention results in a duplexer which has better coupling between resonators and thus wide band characteristic (Col. 8, lines 26-28).

Regarding claim 24, Hiratsuka further teaches a stepped impedance structured resonator of claim 7 having signal input/output means (Col. 4, line 56) coupled thereto.

Regarding claim 25, in Fig. 2 Hiratsuka fails to teach a communication apparatus comprising a filter of claim 24 coupled to an antenna.

However, col. 3, lines 42-49, and claims 14-16, suggests that any of the dielectric filters of his invention, including Fig. 2, can be used to create a duplexer (Col. 3, lines 42-49; see also claims 14-16) which is a communication (Col. 8, line 9) apparatus comprising a filter of claim 24 coupled to an antenna (Fig. 7, antenna 53).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to have coupled an antenna to the dielectric filter of Fig. 2 as suggested by Hiratsuka, since Hiratsuka suggests that coupling an antenna to at least one of the dielectric filters of the invention results in a duplexer which has better coupling between resonators and thus wide band characteristic (Col. 8, lines 26-28).

Regarding claim 26, in Fig. 2 Hiratsuka fails to teach a communication apparatus comprising a filter of claim 7 coupled to an antenna.

However, col. 3, lines 42-49, and claims 14-16, suggests that any of the dielectric filters of his invention, including Fig. 2, can be used to create a duplexer (Col. 3, lines 42-49; see also claims 14-16) which is a communication (Col. 8, line 9) apparatus comprising a filter of claim 7 coupled to an antenna (Fig. 7, antenna 53).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to have coupled an antenna to the dielectric filter of Fig. 2 as suggested by Hiratsuka, since Hiratsuka suggests that coupling an antenna to at least one of the dielectric filters of the invention results in a duplexer which has better coupling between resonators and thus wide band characteristic (Col. 8, lines 26-28).

### **Allowable Subject Matter**

5. Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 11-13, Hiratsuka does generically teach that the thickness of various layers can be different in order to adjust the resonance of the filters. However, neither Hiratsuka, or any other prior art, specifically suggests or teaches that the thickness of one or more *outermost* sides of a dielectric layer in a resonator be greater

than the thickness of another dielectric layer in the resonator, such as recited in claims 11-13.

***Response to Arguments***

6. Applicant's arguments with respect to claims 7-16, 18-26 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

7. Any response to this Office Action should be **faxed** to (571) 273-8300 or **mailed** to:

Commissioner for Patents,  
P.O. Box 1450  
Alexandria, VA 22313-1450

**Hand-Delivered responses should be brought to**

Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hamill, whose telephone number is (571) 270-1802. The examiner can normally be reached Mon-Fri from 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal, can be reached at (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric Hamill

Patent Examiner Art Unit 2817

**/BENNY LEE/  
PRIMARY EXAMINER  
ART UNIT 2817**